UCRL-JC-124882 Abs

Abstract Submitted
for the DPP96 Meeting of
The American Physical Society

Sorting Category: 4.9.3 (theoretical)

**Progress in 3D Particle-In-Cell Modeling of Space-Charge-Dominated Ion Beams for Heavy-Ion Fusion**[1] A. FRIEDMAN, D. A. CALLAHAN, D. P. GROTE, A. B. LANGDON, S. M. LUND, *LLNL*, I. HABER, *NRL* — The ion beam in an induction accelerator for HIF is a non-neutral plasma, and is effectively simulated using familiar particle-in-cell (PIC) techniques, with the addition of a description of the accelerating and confining elements. The WARP code incorporates electrostatic 3D and r,z PIC models; a number of techniques are used in the 3D package, WARP3d, to increase accuracy and efficiency. These include solution of Poisson's equation with subgrid-scale resolution of internal boundary placement, a bent-system model using "warped" coordinates, and parallel processing. In this paper we describe recent applications to HIF experiments, including a high-current electrostatic-quadrupole injector at LBNL, and bending and recirculation experiments at LLNL. We also describe new computational techniques being studied, including higher-order integrators and subcycling methods aimed at allowing larger timesteps, and a "fat-slice" model which affords efficient examination of collective modes that transfer thermal energy between degrees of freedom.

[1]Work performed under the auspices of U.S. DOE by LLNL Contract W-7405-ENG-48 and NRL Contract DE-AI02-94ER54232.

☐ Prefer Oral Session
☒ Prefer Poster Session

Alex Friedman
af@llnl.gov
LLNL

Date submitted: July 10, 1996

Electronic form version 1.1